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Spatial and Temporal Variability in Sediment Delivery from Large Rivers to the Asia-Pacific Rim

DAVID HIGGITT[1], XI XI LU[1]

[1] *National University of Singapore*

Large rivers play a significant role in the transfer of freshwater and particulate matter from continents to oceans. The transfer process is, in turn, a major component of the global carbon cycle and directly influences productivity on the coastal shelf. The Asia-Pacific Rim is one of the most significant interchanges between terrestrial and ocean stores on the planet where high fluvial suspended sediment loads are generated due to tectonic setting, rapid weathering rates and monsoon rainfall regimes. Recent work from the Yangtze, Pearl and Mekong Rivers has adopted a GIS framework for investigating spatial and temporal trends in sediment transfer dynamics. Reconstructed data archives can be related to geomorphological controls and human influences within parts of river basins. Human intervention through land cover change and expansion of agriculture has contributed to increasing erosion rates in recent decades while river basin development, principally dam construction and irrigation systems, inhibits downstream sediment conveyance. The competing influence of these disturbances has significant implications for modeling of biogeochemical fluxes from continents to oceans. The paper will review options for improving the capability of modeling water and sediment transfer within large river basins.